



SEQUENCE LISTING

<110> Gordon-Kamm, William
Lowe, Keith
Sun, Yuejin
Dilkes, Brian
Larkins, Brian

<120> Cell Cycle Nucleic Acids, Polypeptides,
and Uses Thereof

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<160> 12

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<212> DNA

<213> zea mays

<220>

<221> CDS

<222> (134)...(902)

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ggcgttgcgt cag atg ggg aag tac atg cgc aag tgc agg ggc gcc gca	169
Met Gly Lys Tyr Met Arg Lys Cys Arg Gly Ala Ala	
1 5 10	
ggc gcg gag gtc gcc gcc gtc gag gtt acg cag gtc gtc ggc gtc cgg	217
Gly Ala Glu Val Ala Ala Val Glu Val Thr Gln Val Val Gly Val Arg	
15 20 25	
acg agg tcc agg tcc gcg gcg gcg acc ggc ggt gtc gcg aag gtc gcc	265
Thr Arg Ser Arg Ser Ala Ala Ala Thr Gly Gly Val Ala Lys Val Ala	
30 35 40	
ccg agg agg aag agg gcg ccg gcg ggg gag cct gct gcc gcc gtg agc	313
Pro Arg Arg Lys Arg Ala Pro Ala Gly Glu Pro Ala Ala Ala Val Ser	
45 50 55 60	
gct ggt ggg gac ggc gga agc tgc tac atc cac ctg cgt agc cgc atg	361
Ala Gly Gly Asp Gly Gly Ser Cys Tyr Ile His Leu Arg Ser Arg Met	
65 70 75	
ctg ttc atg gca ccg cct cag ccg cag ccg tcg gtt gac tcg gtt ccg	409
Leu Phe Met Ala Pro Pro Gln Pro Gln Pro Ser Val Asp Ser Val Pro	
80 85 90	
acc ccg gtg gag gct gct gat ggc gct gca gga cag cag ggc gcg gcg	457

Thr	Pro	Val	Glu	Ala	Ala	Asp	Gly	Ala	Ala	Gly	Gln	Gln	Gly	Ala	Ala		
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ctc	gcg	gcc	ggg	ctc	tcg	cgt	tgc	tcc	agc	acg	gcg	tcg	tcg	gtg	aac		505
Leu	Ala	Ala	Gly	Leu	Ser	Arg	Cys	Ser	Ser	Thr	Ala	Ser	Ser	Val	Asn		
	110					115					120						
ttg	ggc	ttg	ggg	ggg	cag	cgc	ggg	agc	cac	acc	tgc	cgc	tcc	tac	gac		553
Leu	Gly	Leu	Gly	Gly	Gln	Arg	Gly	Ser	His	Thr	Cys	Arg	Ser	Tyr	Asp		
	125				130					135					140		
gct	gca	gag	gct	ggc	ggg	gat	cac	gtc	ctg	gtg	gat	gtc	tcg	gcg	gcg		601
Ala	Ala	Glu	Ala	Gly	Gly	Asp	His	Val	Leu	Val	Asp	Val	Ser	Ala	Ala		
				145					150					155			
agc	aac	tcc	ggg	agc	ggc	cca	gac	cgc	gag	agg	cga	gag	acg	acg	cca		649
Ser	Asn	Ser	Gly	Ser	Gly	Pro	Asp	Arg	Glu	Arg	Arg	Glu	Thr	Thr	Pro		
			160					165					170				
tcg	agc	cgg	gcg	cac	ggc	gag	ctc	agc	gat	ctg	gag	tcg	gat	ctg	gcg		697
Ser	Ser	Arg	Ala	His	Gly	Glu	Leu	Ser	Asp	Leu	Glu	Ser	Asp	Leu	Ala		
		175					180					185					
ggg	cac	aag	act	ggc	ccg	tcg	cta	ccg	gcg	gca	acg	ccg	gct	gcg	gag		745
Gly	His	Lys	Thr	Gly	Pro	Ser	Leu	Pro	Ala	Ala	Thr	Pro	Ala	Ala	Glu		
	190					195					200						
ctg	atc	gtg	ccg	cca	gca	cac	gag	atc	cag	gag	ttc	ttc	gcc	gcc	gcc		793
Leu	Ile	Val	Pro	Pro	Ala	His	Glu	Ile	Gln	Glu	Phe	Phe	Ala	Ala	Ala		
	205				210					215					220		
gag	gcg	gcc	cag	gcc	aag	cgc	ttt	gct	tcc	aag	tac	aac	ttc	gac	ttc		841
Glu	Ala	Ala	Gln	Ala	Lys	Arg	Phe	Ala	Ser	Lys	Tyr	Asn	Phe	Asp	Phe		
			225					230					235				
gtc	cgc	ggc	gtg	ccc	ctc	gac	gcc	ggc	ggc	cgg	ttc	gag	tgg	gcg	ccg		889
Val	Arg	Gly	Val	Pro	Leu	Asp	Ala	Gly	Gly	Arg	Phe	Glu	Trp	Ala	Pro		
			240					245					250				
gtg	gtc	agc	atc	t	gaagc	gagcg	tgcgt	ccggt	gcaag	gtgaa	gctaga	aaaga					942
Val	Val	Ser	Ile														
			255														
gaaaagatgc cccccccccc cccccccaac aaacataacg gagaagagaa aaaccaaaca																	1002
attaagcagc tttatatagc ctaagctaac caccaccatt catctcgtcc aaatgcatgc																	1062
cttgcttttc tctggagcta gcaggagcgt agttattatt tagtactact ttacttattc																	1122
agaggttatc ttgaccccga tagatcaatc cgcttactgt gtaatttctc tcatgcatct																	1182
cttagatgga gtttaatcgt cttaattttat tactgtacag cagcttgstt ggcttgcaaa																	1242
gaaagatctg gtttgtctca aaaaaaaaaa aaaaaaaaaa aaaaaaaggc cgccgctct																	1302
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 <213> zea mays

<220>
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 <223> Xaa = Any Amino Acid

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Ser	Ala	Ala	Ala	Thr	Gly	Gly	Val	Ala	Lys	Val	Ala	Pro	Arg	Arg	Lys
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Arg	Ala	Pro	Ala	Gly	Glu	Pro	Ala	Ala	Ala	Val	Ser	Ala	Gly	Gly	Asp
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Gly	Gly	Ser	Cys	Tyr	Ile	His	Leu	Arg	Ser	Arg	Met	Leu	Phe	Met	Ala
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Pro	Pro	Gln	Pro	Gln	Pro	Ser	Val	Asp	Ser	Val	Pro	Thr	Pro	Val	Glu
				85					90					95	
Ala	Ala	Asp	Gly	Ala	Ala	Gly	Gln	Gln	Gly	Ala	Ala	Leu	Ala	Ala	Gly
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Leu	Ser	Arg	Cys	Ser	Ser	Thr	Ala	Ser	Ser	Val	Asn	Leu	Gly	Leu	Gly
		115					120					125			
Gly	Gln	Arg	Gly	Ser	His	Thr	Cys	Arg	Ser	Tyr	Asp	Ala	Ala	Glu	Ala
		130				135					140				
Gly	Gly	Asp	His	Val	Leu	Val	Asp	Val	Ser	Ala	Ala	Ser	Asn	Ser	Gly
145					150					155					160
Ser	Gly	Pro	Asp	Arg	Glu	Arg	Arg	Glu	Thr	Thr	Pro	Ser	Ser	Arg	Ala
			165						170					175	
His	Gly	Glu	Leu	Ser	Asp	Leu	Glu	Ser	Asp	Leu	Ala	Gly	His	Lys	Thr
			180					185					190		
Gly	Pro	Ser	Leu	Pro	Ala	Ala	Thr	Pro	Ala	Ala	Glu	Leu	Ile	Val	Pro
		195					200					205			
Pro	Ala	His	Glu	Ile	Gln	Glu	Phe	Phe	Ala	Ala	Ala	Glu	Ala	Ala	Gln
		210				215					220				
Ala	Lys	Arg	Phe	Ala	Ser	Lys	Tyr	Asn	Phe	Asp	Phe	Val	Arg	Gly	Val
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<220>
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tcgaaaccct	agcttgccca	gcccctccgg	gcc atg	ggc aag	tac atg cgc aag	174

	Met	Gly	Lys	Tyr	Met	Arg	Lys	
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gcc aag gct tcc agc gag gtt gtc atc atg gat gtc gcc gcc gct ccg								222
Ala Lys Ala Ser Ser Glu Val Val Ile Met Asp Val Ala Ala Ala Pro								
	10				15		20	
ctc gga gtc cgc acc cga gcg cgc gcc ctc gcg ctg cag cgt ctg cag								270
Leu Gly Val Arg Thr Arg Ala Arg Ala Leu Ala Leu Gln Arg Leu Gln								
	25				30		35	
gag cag cag acg cag tgg gag gaa ggt gct ggc ggc gag tac ctg gag								318
Glu Gln Gln Thr Gln Trp Glu Glu Gly Ala Gly Gly Glu Tyr Leu Glu								
	40				45		50	55
cta agg aac cgg agg ctc gag aag ctg ccg ccg ccg ccg gcg acc acg								366
Leu Arg Asn Arg Arg Leu Glu Lys Leu Pro Pro Pro Pro Ala Thr Thr								
			60			65	70	
agg agg tcg ggc ggg agg aaa gcg gca gcc gag gcc gcc gca act aag								414
Arg Arg Ser Gly Gly Arg Lys Ala Ala Ala Glu Ala Ala Ala Thr Lys								
		75			80		85	
gag gct gag gcg tcg tac ggg gag aac atg ctc gag ttg gag gcc atg								462
Glu Ala Glu Ala Ser Tyr Gly Glu Asn Met Leu Glu Leu Glu Ala Met								
	90				95		100	
gag agg att acc agg gag acg acg cct tgc agc ttg att aac acc cag								510
Glu Arg Ile Thr Arg Glu Thr Thr Pro Cys Ser Leu Ile Asn Thr Gln								
	105				110		115	
atg act agc act cct ggg tcc acg aga tcc agc cac tct tgc cac cgc								558
Met Thr Ser Thr Pro Gly Ser Thr Arg Ser Ser His Ser Cys His Arg								
	120				125		130	135
agg gtg aac gct cct ccg gtg cac gcc gtc cca agt tcg agg gag atg								606
Arg Val Asn Ala Pro Pro Val His Ala Val Pro Ser Ser Arg Glu Met								
			140			145	150	
aat gag tac ttc gct gcc gaa cag cga cgc caa caa cag gat ttc att								654
Asn Glu Tyr Phe Ala Ala Glu Gln Arg Arg Gln Gln Gln Asp Phe Ile								
		155				160	165	
gac aag tac aac ttc gat cct gca aac gac tgc cct ctc cca ggc agg								702
Asp Lys Tyr Asn Phe Asp Pro Ala Asn Asp Cys Pro Leu Pro Gly Arg								
	170				175		180	
ttt gag tgg gtg aag cta gac t gatggattca gagggacgag agagcagcag								754
Phe Glu Trp Val Lys Leu Asp								
	185				190			
gcatggaatg gaatggaact cccccccgc tccctccaca ccacccacgc gttgtggcag								814
aggcgcatac cgctcgtgta gcttcgtttc tgctgtaaaa aaaaacttag tgttttagca								874
tgtagcctta attggtcgtg tgttacagta cagaactgat gctgagttac aacaccctga								934
tctggtcttg atctgatccc tcaactccaa tgtaaccctt aacagctcat tctgtaagga								994
acctgtcacc ctgttacctg ttgctgaact aatgaagtag agctagataa tgacgtttta								1054

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1089

<210> 4
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 <212> PRT
 <213> zea mays

<400> 4
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 Leu Ala Leu Gln Arg Leu Gln Glu Gln Gln Thr Gln Trp Glu Glu Gly
 35 40 45
 Ala Gly Gly Glu Tyr Leu Glu Leu Arg Asn Arg Arg Leu Glu Lys Leu
 50 55 60
 Pro Pro Pro Pro Ala Thr Thr Arg Arg Ser Gly Gly Arg Lys Ala Ala
 65 70 75 80
 Ala Glu Ala Ala Ala Thr Lys Glu Ala Glu Ala Ser Tyr Gly Glu Asn
 85 90 95
 Met Leu Glu Leu Glu Ala Met Glu Arg Ile Thr Arg Glu Thr Thr Pro
 100 105 110
 Cys Ser Leu Ile Asn Thr Gln Met Thr Ser Thr Pro Gly Ser Thr Arg
 115 120 125
 Ser Ser His Ser Cys His Arg Arg Val Asn Ala Pro Pro Val His Ala
 130 135 140
 Val Pro Ser Ser Arg Glu Met Asn Glu Tyr Phe Ala Ala Glu Gln Arg
 145 150 155 160
 Arg Gln Gln Gln Asp Phe Ile Asp Lys Tyr Asn Phe Asp Pro Ala Asn
 165 170 175
 Asp Cys Pro Leu Pro Gly Arg Phe Glu Trp Val Lys Leu Asp
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<210> 5
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 <223> r = nucleotide a or g; Xaa = Any Amino Acid

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 agcgagaaga aggcagtgct gcggcggcgt tccgtaag atg ggg aag tac atg cgc 176
 Met Gly Lys Tyr Met Arg
 1 5
 aag cgc agg ggg gcc gcg ggc gag ggg gtg gcc gca gtc gag gtc tcg 224
 Lys Arg Arg Gly Ala Ala Gly Glu Gly Val Ala Ala Val Glu Val Ser
 10 15 20
 cag gtc gtc ggc gtc cgg acg agg tcc agg tcc gcg gcg gcg acc ggc 272
 Gln Val Val Gly Val Arg Thr Arg Ser Arg Ser Ala Ala Ala Thr Gly

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ggc	ggt	gtc	gcg	aag	gtc	gct	ccg	ccg	agg	agg	aag	aag	gcg	ctg	ctg	320
Gly	Gly	Val	Ala	Lys	Val	Ala	Pro	Pro	Arg	Arg	Lys	Lys	Ala	Leu	Leu	
	40					45					50					
ccc	gcc	gcg	aac	gtg	acg	acg	tcg	ggg	gag	cct	ggt	gcc	gtg	ggc	gct	368
Pro	Ala	Ala	Asn	Val	Thr	Thr	Ser	Gly	Glu	Pro	Gly	Ala	Val	Gly	Ala	
55					60					65					70	
ggt	ggt	ggg	gac	ggc	gga	agc	tgc	tgc	tac	atc	cac	ctg	cgg	agc	cgc	416
Gly	Gly	Gly	Asp	Gly	Gly	Ser	Cys	Cys	Tyr	Ile	His	Leu	Arg	Ser	Arg	
				75					80					85		
atg	ctg	ttc	atg	gca	gca	cct	cag	cag	caa	ccg	tcg	gcg	gct	ctg	acg	464
Met	Leu	Phe	Met	Ala	Ala	Pro	Gln	Gln	Gln	Pro	Ser	Ala	Ala	Leu	Thr	
			90					95					100			
ccg	gtg	gag	gct	gct	ggt	gcg	gca	car	caa	ggc	ggg	gtg	gtg	gcg	ctc	512
Pro	Val	Glu	Ala	Ala	Gly	Ala	Ala	Xaa	Gln	Gly	Gly	Val	Val	Ala	Leu	
		105					110					115				
gcg	gct	ggc	ctc	tcg	cgt	tgc	tcc	agc	acg	gcg	tcg	tcg	gtg	gac	gtc	560
Ala	Ala	Gly	Leu	Ser	Arg	Cys	Ser	Ser	Thr	Ala	Ser	Ser	Val	Asp	Val	
	120					125					130					
ggg	ggc	cac	gcc	tgc	cgc	tcc	gac	gct	gcg	cct	gcg	gag	gtt	gac	ggg	608
Gly	Gly	His	Ala	Cys	Arg	Ser	Asp	Ala	Ala	Pro	Ala	Glu	Val	Asp	Gly	
135					140					145					150	
gat	cac	gtc	ccg	gat	gtc	gtc	acc	gcg	agc	aac	tcg	ggg	agc	gtc	ccg	656
Asp	His	Val	Pro	Asp	Val	Val	Thr	Ala	Ser	Asn	Ser	Gly	Ser	Val	Pro	
				155					160					165		
gac	cgc	gag	agg	aga	gag	acg	acg	cca	tcg	tcg	agc	cgg	gcg	cac	ggc	704
Asp	Arg	Glu	Arg	Arg	Glu	Thr	Thr	Pro	Ser	Ser	Ser	Arg	Ala	His	Gly	
			170					175					180			
ggc	gag	ctc	agc	gat	ctg	gag	tcg	gat	ctg	gtg	ggg	cgg	cag	aag	act	752
Gly	Glu	Leu	Ser	Asp	Leu	Glu	Ser	Asp	Leu	Val	Gly	Arg	Gln	Lys	Thr	
		185					190					195				
ggc	tgc	tcg	tcg	tcg	ccg	gcg	aca	aca	aca	tcg	gct	gcg	gag	ctg	atc	800
Gly	Cys	Ser	Ser	Ser	Pro	Ala	Thr	Thr	Thr	Ser	Ala	Ala	Glu	Leu	Ile	
	200					205					210					
gtg	ccg	cca	gca	cag	gag	atc	cag	gaa	ttc	ttc	gcg	gcc	gc			841
Val	Pro	Pro	Ala	Gln	Glu	Ile	Gln	Glu	Phe	Phe	Ala	Ala				
215					220					225						

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 <213> zea mays

<220>
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 <223> Xaa = Any Amino Acid

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 Ser Ala Ala Ala Thr Gly Gly Gly Val Ala Lys Val Ala Pro Pro Arg
 35 40 45
 Arg Lys Lys Ala Leu Leu Pro Ala Ala Asn Val Thr Thr Ser Gly Glu
 50 55 60
 Pro Gly Ala Val Gly Ala Gly Gly Gly Asp Gly Gly Ser Cys Cys Tyr
 65 70 75 80
 Ile His Leu Arg Ser Arg Met Leu Phe Met Ala Ala Pro Gln Gln Gln
 85 90 95
 Pro Ser Ala Ala Leu Thr Pro Val Glu Ala Ala Gly Ala Ala Xaa Gln
 100 105 110
 Gly Gly Val Val Ala Leu Ala Ala Gly Leu Ser Arg Cys Ser Ser Thr
 115 120 125
 Ala Ser Ser Val Asp Val Gly Gly His Ala Cys Arg Ser Asp Ala Ala
 130 135 140
 Pro Ala Glu Val Asp Gly Asp His Val Pro Asp Val Val Thr Ala Ser
 145 150 155 160
 Asn Ser Gly Ser Val Pro Asp Arg Glu Arg Arg Glu Thr Thr Pro Ser
 165 170 175
 Ser Ser Arg Ala His Gly Gly Glu Leu Ser Asp Leu Glu Ser Asp Leu
 180 185 190
 Val Gly Arg Gln Lys Thr Gly Cys Ser Ser Ser Pro Ala Thr Thr Thr
 195 200 205
 Ser Ala Ala Glu Leu Ile Val Pro Pro Ala Gln Glu Ile Gln Glu Phe
 210 215 220
 Phe Ala Ala
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<210> 7
 <211> 7
 <212> PRT
 <213> zea mays

<400> 7
 Met Gly Lys Tyr Met Arg Lys
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<210> 8
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 <212> DNA
 <213> zea mays

<220>
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<223> n = Any nucleotide; r = nucleotide a or g; y = nucleotide t
or c

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<210> 9
<211> 21
<212> DNA
<213> zea mays

<220>
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<223> n = Any nucleotide; r = nucleotide a or g; y = nucleotide t
or c

<400> 9
atgggnaart ayatgagraa r 21

<210> 10
<211> 42
<212> PRT
<213> zea mays

<400> 10
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20 25 30
Arg Phe Glu Trp Ala Pro Val Val Ser Ile
35 40

<210> 11
<211> 38
<212> PRT
<213> zea mays

<400> 11
Glu Tyr Phe Ala Ala Glu Gln Arg Arg Gln Gln Gln Asp Phe Ile Asp
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Lys Tyr Asn Phe Asp Pro Ala Asn Asp Cys Pro Leu Pro Gly Arg Phe
20 25 30
Glu Trp Val Lys Leu Asp
35

<210> 12
<211> 46
<212> PRT
<213> zea mays

<400> 12

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Lys	Arg	Phe	Ala	Ser	Lys	Tyr	Asn	Phe	Asp	Phe	Val	Arg	Gly	Val	Pro
			20					25					30		
Leu	Asp	Ala	Gly	Arg	Phe	Glu	Trp	Thr	Pro	Gly	Val	Ser	Ile		
		35					40					45			